Flight-Testing Newton's Laws			
2006 Science			
Grade Level Expectations			
Delaware Science			
Grade 9			
Activity/Lesson	**State**	**Standards**	
Session-10 (1-5)	DE	SCI.9.1.1.28	Recognize that the kinetic energy of an object depends on the square of its speed, and that KE =½ mv2.
Session-10 (1-5)	DE	SCI.9.1.1.29	Collect and graph data that shows that the potential energy of an object increases linearly with the weight of an object (mg) and with its height above a pre-defined reference level, h. (GPE = mgh)
Session-6 (1-8)	DE	SCI.9.1.1.28	Recognize that the kinetic energy of an object depends on the square of its speed, and that KE =½ mv2.
Session-6 (1-8)	DE	SCI.9.1.1.36	Conduct investigations to determine the behavior of elastic materials. Graph the data and identify the relationship between the extent of the stretch and the size of the elastic force (i.e., Felastic = kx where x = stretch).
Session-6 (1-8)	DE	SCI.9.1.1.38	Identify that ‘work’ is the process by which a force transfers energy to an object, and use measured quantities to make calculations of the work done by forces (W = energy transferred = F·D).
Session-6 (1-8)	DE	SCI.9.3.1.3	Conduct investigations involving moving objects to examine the influence that the mass and the speed have on the kinetic energy of the object. Collect and graph data that supports that the kinetic energy depends linearly upon the mass, but nonlinearly upon the speed. Recognize that the kinetic energy of an object depends on the square of its speed, and that KE =½ mv2.
Session-6 (1-8)	DE	SCI.9.3.2.10	Conduct investigations to determine the behavior of elastic materials. Graph the data and identify the relationship between the extent of the stretch and the size of the elastic force (i.e., Felastic = kx where x = stretch).
Session-6 (1-8)	DE	SCI.9.3.2.12	Give examples of common forces transferring energy to (or away from) objects. For example; a pulling force can transfer energy to an object (when the object is pulled along a floor), a pushing force can transfer energy away from an object (to slow its motion), and friction and air resistance always transfer kinetic energy away from moving objects.
Flight-Testing Newton's Laws			
2006 Science			

Grade Level Expectations			
Delaware Science			
Grade 11			
Activity/Lesson	**State**	**Standards**	
Session-10 (1-5)	DE	SCI.11.1.1.13	Give examples in which static friction is a force of propulsion, initiating the motion of an object. Use force diagrams to illustrate the forces acting on the object during this propulsion process.
Session-10 (1-5)	DE	SCI.11.1.1.14	Use force diagrams to describe how static friction can prevent an object (that is subject to another force) from moving.
Session-10 (1-5)	DE	SCI.11.1.1.15	Draw force diagrams to illustrate the action of friction when it acts to slowdown an object. Use an energy argument to describe how friction slows down a moving object.
Session-9 (1-7)	DE	SCI.11.1.1.34	Use Newton's 2nd Law to explain why these two objects may react differently to equal sized forces.
Session-9 (1-7)	DE	SCI.11.3.2.20	Reflect on how forces can collectively act on the object and not change its motion (basis of Newton's 1st Law).
Session-9 (1-7)	DE	SCI.11.3.2.21	Conduct investigations to reach qualitative and quantitative conclusions regarding the effects of the size of the total force and the object's mass on its resulting acceleration (Newton's 2nd Law, a = Ftotat/m). Observe how the direction of the acceleration relates to the direction of the total force.
Session-9 (1-7)	DE	SCI.11.3.2.24	Use Newton's Second Law to calculate the acceleration of objects that are subject to common forces (for example, gravity, constant pushing or pulling forces and/or friction).
Session-9 (1-7)	DE	SCI.11.3.2.29	Conduct investigations (or demonstrate) that under a variety of conditions when two objects collide they exert equal sized forces on each other. Use Newton's 2nd Law to explain why these two objects may react differently to equal sized forces.